

THURSDAY, AUGUST 31, 1905.

BRITISH MOSSES.

The British Moss-Flora. By R. Braithwaite, M.D., F.L.S., &c. Pp. x + 315; 268; 274 + plates. (London: L. Reeve and Co., 1887 to 1905.)

WE offer to Dr. Braithwaite our most sincere congratulations on the completion of this work on his favourite class of plants. Begun, as regards publication, in 1880, it reached completion by the issue of the last part with index and supplement in May of this year, so that the course of publication has occupied a space of some quarter of a century. In the last number Dr. Braithwaite takes leave of his readers in a postscript in which he expresses his regret that he is unable to include the Sphagnaceæ in the work; but he finds that to study these again at the age of eighty-one, and to draw some twenty-five plates, would be hopeless. All lovers of mosses will share in this regret, at the same time remembering that they owe to Dr. Braithwaite an interesting monograph on the peat mosses of Europe and America, published in 1880. The author concludes the whole matter with a quotation of some lines (little known, we suspect) by Ehrhart, which are interesting as disclosing the mental attitude of the venerable author at the conclusion of his labours; they begin thus:—

“Vernimm's und siehe die Wunder der Werke,
Die, die Natur dir aufgestellt!
Verkündigt Weisheit und Ordnung und Stärke
Dir nicht den Herren, den Herren der Welt?”

The three volumes of Dr. Braithwaite's book are illustrated by 128 pages of plates, giving figures of every moss described, with enlarged designs of parts of the various species. Every one of these plates has been engraved from the drawings of the author himself, and together constitute a remarkable monument of his skill and industry. Indeed, the illustrations may be regarded as perhaps the most distinctive feature of the work. In some cases a whole page is devoted to a single species, as *Schistostega*, or to two species, as in the strange genus *Buxbaumia*; but generally four or more plants are dealt with in a single plate. So far as we have compared the figures of our author with nature, we have found his drawings accurate, and the magnified parts very valuable for the purposes of identification.

If we were inclined to be adversely critical on the plates, we should say that to some extent strength has been sacrificed to elegance. If you turn from the drawings of Braithwaite to the plates of old Dillenius, you are conscious of a marked difference of treatment; the old figures are more robust and graphic, and the general facies of the plant is more forcibly impressed upon the mind. But this difference is perhaps an inevitable result of our advanced knowledge of the distinctions between kindred species; the earlier artist was not haunted by the perception of minute details which make the later artist at once more timorous and exact.

The classification principally adopted by Dr. Braithwaite is that of Prof. Lindberg, by which the cleistocarpous mosses are no longer treated as a group by themselves, but are introduced into the stegocarpous families, and are regarded as imperfectly developed forms of more highly organised stegocarpous congeners. There can be no doubt that the distinctions based upon the presence or absence of a peristome and on the number of teeth in the peristome received an exaggerated amount of attention from many bryologists; they were for the moss flora somewhat as the number of stamens and pistils was in the hands of Linnæus for phænogamous plants.

Whenever a genus contains more than one species, Dr. Braithwaite gives a *clavis* to the species, arranged dichotomously, and this appears to us to be very carefully and well done—a fact which increases our regret that the author has not given similar guidance between the families, subfamilies, and genera of the whole group, so that the student might have been conducted by the use of the necessary differentia from the summum genus to the ultima species. But where so much has been given, it would be ungracious to complain that something is still wanting.

Mr. Dixon, in his preface to his “Student's Handbook of British Mosses” (1896), referred to the book now under review as “Braithwaite's splendid and elaborate work . . . which has done so much to stimulate the study of these plants in our country and which will doubtless remain our standard work for many years to come.” In this generous appreciation by one botanist of the work of another, we cordially agree, and we rejoice for ourselves, as well as for the author, at the completion of a noble piece of honest work.

Before we part from the book we wish to make this review the vehicle of a thought that has frequently occurred to us. In the last number of Dr. Braithwaite's book we find a notice of *Catharinia tenella*—which has been found near Goudhurst, in Kent, by that keen bryologist Lord Justice Stirling—mixed with *Catharinia angustata*. This is only one instance of a common fact, viz. the coexistence side by side of two kindred species.

Thus, turning over at random some pages of Wilson's “Bryologia Britannica” (a book more easy to use for such a purpose than the luxurious pages of Braithwaite), we find that *Fissidens viridulus* is recorded as growing with *F. exilis*, *Hypnum Swartzii* as growing with *H. praelongum*, *Hypnum chrysophyllum* as found with *H. stellatum*, *Hypnum resupinatum* in like manner with *H. cupressiforme*, and *Hypnum elegans* as often growing with *H. denticulatum*; and in all these cases the two species are so nearly akin that they stand next to one another on Wilson's pages. A further search would, we feel sure, bring to light many similar cases, including those in which forms recognised only as varieties are found side by side with the normal form. This fact seems to us to be worthy of further attention. Is it due solely to the suitability of the same spot to several species of the same genus, or is it

due to some genetic relation between the two organisms, the one producing the other at various times and in divers places in the same way as the normal *Linaria vulgaris* from time to time and in this spot and the other produces the peloric form? Have we caught one species in the act of producing another?
E. F.

EXPERIMENTAL MORPHOLOGY.

Einleitung in der experimentelle Morphologie der Tiere. By Dr. Hans Przibram. Pp. 142. (Leipzig and Vienna: Franz Deulicke, 1904.) Price 4 marks.

THIS volume is divided into thirteen practically independent sections, and represents the "fast unveränderte Drucklegung" of a course of lectures delivered by the author during the session of 1903-4 at the Wiener University. The author has been induced to publish these lectures by the belief that all previous works of a general nature dealing with experimental embryology have either been written wholly in support of particular theories (e.g. Driesch, Haacke, Herbst) or only deal with a portion of the subject (e.g. Davenport, Hertwig, Korschelt, Maas, Morgan, Wilson, Ziegler). The present work is intended, therefore, as an introduction to the whole subject from an impartial standpoint.

In the first section, which deals mainly with the scope of experimental morphology, the author, after weighing the various names which have been proposed for the science—Entwicklungsmechanik, Entwicklungsphysiologie, kausale Morphologie, &c.—adopts Davenport's name, "experimental morphology," but defines it as including not only the experimental study of the factors determining form in ontogeny, but also in phylogeny (Umwandlungsphysiologie), so that Driesch's term "rationelle Morphologie" would seem to be more appropriate.

The uncertainty as to the proper scope of the science which this considerable choice of names exhibits is in part due to its recent growth, but it is also due in no small measure to the close connection in which experimental morphology must always stand to the other sciences.

That the author has not been more successful than his predecessors in determining suitable limits to the subject is very clearly shown by his treatment of the section dealing with the "Spezifische Bestimmung." In this section the author describes the influence of relationship in transplantation experiments, and the persistence of specific characters in the transplanted tissues. He then refers to Heape's experiment, in which normal development of an Angora rabbit is obtained, though transplanted shortly after fertilisation into the uterus of a Belgian rabbit, from which, however, the author's conclusion that transfusion of strange blood has no morphogenic influence hardly follows. Following this is an account of immunity and blood relationship experiments. If it is difficult to see why these subjects should be included in a science ostensibly dealing with the factors determining form, this difficulty is still greater when the author proceeds to consider the distribution in the

animal kingdom of the various proteid substances contained in muscle fibre.

In the fourth section, "Die Bewegung-Taxis," the author gives a series of very far-fetched comparisons between the behaviour of unicellular animals and of the higher Metazoa. The sensation of thirst is compared with the hydrotaxis of the Mycetozoa, and Davenport's example is followed in regarding as rheotaxis the behaviour of fish in swimming against the stream, the only position in which they are able to breathe. Finally, the "Thigmotaxis" exhibited by an oxytrocha moving round a spherical egg, unable to leave its surface, is compared with the retreat of a cat into the corner as a dog approaches, or to the preference shown by many people for those seats in a restaurant which have their backs to the wall!

In the twelfth section, "Die Vererbung," the author, after giving a brief account of the current theories of heredity, shows how these are in "schönster Uebereinstimmung" with our recent knowledge concerning the constitution of the nucleus. This agreement is obtained by assuming reduction to consist in the elimination of whole chromosomes during the maturation divisions, the view that this process represents the belated union of the paternal and maternal chromosomes not being mentioned.

In the final section, "Die Artwandlung," the author discusses the influence of external factors in causing transmissible variations.

The wide range covered by the book, the thirteen sections of which only average ten pages each, has resulted in a somewhat superficial mode of treatment, and neither in point of comprehensiveness nor of impartial treatment can the book be said to fill the want which, according to the author, has been left unsatisfied by all previous workers. G. C. C.

ATLAS OF EMISSION SPECTRA.

Atlas of Emission Spectra of most of the Elements.

By Drs. Hagenback and Konen. English translation by Dr. A. S. King. Pp. v+70 and plates. (Jena: G. Fischer; London: Wm. Wesley and Sons, 1905.) Price 27s.

THIS atlas comprises the results of an investigation of the spark, arc, and flame spectra of most of the chemical elements. Twenty-eight charts are given showing heliographic reproductions of photographs taken with the aid of two small Rowland concave gratings, each of 1 metre radius and 20,000 lines to the inch. One of the gratings had a ruled space 9 cm. broad, and was used chiefly for the region of shorter wave-length. The other had a breadth of 5 cm., and was used to photograph the less refrangible portion of the spectrum. For each group of metals two charts are given, one showing the normally visual part of the spectrum, the other the violet and ultra-violet region. The dispersion given by the gratings is such that the length of spectrum from the K line of calcium (λ 3934) to the D lines of sodium (λ 5893) is about 4.5 inches, or 11 cm., each scale division on the reproductions corresponding to